What is claimed is:

1. In a surface configuration measuring method using, as testing optics, stereoscopic lattice type of moiré optics including a light source and a lattice pattern for producing moiré fringes and a light-sensitive device including a lens and a camera for picking up said moiré fringes,

moiré fringes of a particular fringe order are shifted by a preselected phase while a measurement range of said testing optics is limited to a vicinity of said particular fringe order, thereby generating at least three moiré image data shifted in phase, and

the at least three moiré image data are arithmetically processed to thereby tridimensionally measure a surface configuration of a work.

2. The method as claimed in claim 1, wherein a range of the work to be tested by said testing optics is divided into a plurality of zones, and

a relative position between said testing optics and the work is sequentially shifted in a direction of division of said range to thereby measure the surface configuration zone by zone.

3. The method as claimed in claim 2, wherein a distance between said light source and said light-sensitive device is varied for thereby shifting the moiré

fringes of the particular fringe order by the preselected phase.

4. The method as claimed in claim 2,wherein a position of the work is varied in a direction of an optical axis of said camera for thereby shifting the moiré fringes of the particular fringe order by the preselected phase.

5. The method as claimed in claim 2, wherein a position of said lattice pattern is varied on an optical axis of said camera for thereby shifting the moiré fringes of the particular fringe order by the preselected phase.

6. The method as claimed in claim 2, wherein said camera outputs the at least three moiré image data by picking up the work over a single measurement range only one time.

7. The method as claimed in claim 2, wherein said light-sensitive device comprises a single or three or more line sensors.

8. The method as claimed in claim 2, wherein said light-sensitive device comprises an area sensor camera, and

an equation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera to thereby measure the surface configuration.

9. The method as claimed in claim 2, wherein said

lattice pattern comprises a liquid crystal device.

10. The method as claimed in claim 1, wherein a distance between said light source and said light-sensitive device is varied for thereby shifting the moiré fringes of the particular fringe order by the preselected phase.

11. The method as claimed in claim 1,wherein a position of the work is varied in a direction of an optical axis of said camera for thereby shifting the moiré fringes of the particular fringe order by the preselected phase.

12. The method as claimed in claim 1, wherein a position of said lattice pattern is varied on an optical axis of said camera for thereby shifting the moiré fringes of the particular fringe order by the preselected phase.

13. The method as claimed in claim 1, wherein said camera outputs the at least three moiré image data by picking up the work over a single measurement range only one time.

14. The method as claimed in claim 1, wherein said light-sensitive device comprises a single or three or more line sensors.

15. The method as claimed in claim 1, wherein said light-sensitive device comprises an area sensor camera, and

an equation particular to a phase shifting method

is applied to data output from a single or three or more rows of said area sensor camera to thereby measure the surface configuration.

16. The method as claimed in claim 1, wherein said lattice pattern comprises a liquid crystal device.

17. In a surface configuration measuring method using, as testing optics, stereoscopic lattice type of moiré optics including a light source and a lattice pattern for producing moiré fringes, a light-sensitive device including a lens and a pixel array for picking up said moiré fringes, and a moving mechanism for moving said lattice pattern back and forth in a direction of an optical axis of said light-sensitive device,

said moving mechanism moves said lattice pattern back and forth for thereby shifting moiré fringes of a particular fringe order by a preselected phase,

at least three lines of moiré image data shifted in phase are generated by a one-line scanning time of said light-sensitive device and a reciprocal movement of said lattice pattern synchronous to each other, and

the at least three lines of moiré image data are arithmetically processed for thereby tridimensionally measuring a surface configuration of a work.

18. The method as claimed in claim 17, wherein a range of the work to be tested by said testing optics is divided

into a plurality of zones, and

a relative position between said testing optics and the work is sequentially varied in a direction perpendicular to a direction of division of said range and in said direction of division of said range, thereby measuring the surface configuration of the work zone by zone.

19. The method as claimed in claim 18, wherein said light-sensitive device comprises a single or three or more line sensors.

20. The method as claimed in claim 18, wherein said light-sensitive device comprises an area sensor camera, and

an equation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera to thereby measure the surface configuration.

21. The method as claimed in claim 18, wherein said lattice pattern comprises a liquid crystal device.

22. The method as claimed in claim 17, wherein said light-sensitive device comprises a single or three or more line sensors.

23. The method as claimed in claim 17, wherein said light-sensitive device comprises an area sensor camera, and

an equation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera to thereby measure the surface configuration.

24. The method as claimed in claim 17, wherein said lattice pattern comprises a liquid crystal device.

25. In a surface configuration measuring method using, as testing optics, stereoscopic lattice type of moiré optics including a light source and a stepped lattice pattern for producing moiré fringes, said stepped lattice pattern having at least three lattice surfaces different in height in a direction of an optical axis, a light-sensitive device including a lens and a pixel array for picking up said moiré fringes, and a moving mechanism for moving said stepped lattice pattern back and forth in a direction perpendicular to a direction of said optical axis of said light-sensitive device,

said moving mechanism moves said stepped lattice pattern back and forth to thereby position said lattice patterns of said lattice surfaces on the optical axis one by one, thereby shifting moiré fringes of a particular fringe order by a preselected phase,

at least three lines of moiré image data shifted in phase are generated by a one-line scanning time of said light-sensitive device and a reciprocal movement of said

stepped lattice pattern synchronous to each other, and

the at least three lines of moiré image data are arithmetically processed for thereby tridimensionally measuring a surface configuration of a work.

26. The method as claimed in claim 25, wherein a range of the work to be tested by said testing optics is divided into a plurality of zones, and

a relative position between said testing optics and the work is sequentially varied in a direction perpendicular to a direction of division of said range and in said direction of division of said range, thereby measuring the surface configuration of the work zone by zone.

27. The method as claimed in claim 26, wherein said light-sensitive device comprises a single or three or more line sensors.

28. The method as claimed in claim 26, wherein said light-sensitive device comprises an area sensor camera, and

an equation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera to thereby measure the surface configuration.

29. The method as claimed in claim 26, wherein said lattice pattern comprises a liquid crystal device.

30. The method as claimed in claim 25, wherein said light-sensitive device comprises a single or three or more line sensors.

31. The method as claimed in claim 25, wherein said light-sensitive device comprises an area sensor camera, and

an equation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera to thereby measure the surface configuration.

32. The method as claimed in claim 25, wherein said lattice pattern comprises a liquid crystal device.

33. In a surface configuration measuring method using, as testing optics, stereoscopic lattice type of moiré optics including a light source and a lattice pattern for producing moiré fringes, a light-sensitive device including a lens and a color sensor camera for picking up said moiré fringes, a moving mechanism for moving said lattice pattern back and forth in a direction of an optical axis of said line sensor camera, color filters of different colors positioned between a work and said color sensor camera, and a switching mechanism for positioning one of said color filters on said optical axis,

said moving mechanism moves said lattice pattern back and forth to thereby shift fringe patterns of a

particular fringe order by a preselected phase,

three moiré image data of different colors shifted in phase are generated by a one-line or one-frame scanning time of said color sensor camera and an operation of said switching mechanism synchronous to each other, and

the three moiré image data of different colors are arithmetically processed for thereby tridimensionally measuring a surface configuration of a work.

34. The method as claimed in claim 33, wherein a range of the work to be tested by said testing optics is divided into a plurality of zones, and

a relative position between said testing optics and the work is sequentially varied in a direction perpendicular to a direction of division of said range and in said direction of division of said range, thereby measuring the surface configuration of the work zone by zone.

35. The method as claimed in claim 34, wherein said light-sensitive device comprises a single or three or more line sensors.

36. The method as claimed in claim 34, wherein said light-sensitive device comprises an area sensor camera, and

an equation particular to a phase shifting method is applied to data output from a single or three or more

rows of said area sensor camera to thereby measure the surface configuration.

37. The method as claimed in claim 34, wherein said lattice pattern comprises a liquid crystal device.

38. The method as claimed in claim 33, wherein said light-sensitive device comprises a single or three or more line sensors.

39. The method as claimed in claim 33, wherein said light-sensitive device comprises an area sensor camera, and

an equation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera to thereby measure the surface configuration.

40. The method as claimed in claim 33, wherein said lattice pattern comprises a liquid crystal device.

41. In a surface configuration measuring method using, as testing optics, stereoscopic lattice type of moiré optics including a light source and a stepped lattice pattern for producing moiré fringes, said stepped lattice pattern having three stepped lattice surfaces different in height in a direction of an optical axis, a light-sensitive device including a lens and a color sensor camera for picking up said moiré fringes, a moving mechanism for moving said stepped lattice pattern back and forth in a

direction perpendicular to a direction of said optical axis of said line sensor camera, color filters of different colors positioned between a work and said color sensor camera, and a switching mechanism for positioning one of said color filters on said optical axis,

said moving mechanism moves said lattice pattern back and forth to thereby sequentially position lattice patterns of said lattice surfaces on the optical axis one by one, thereby shifting fringe patterns of a particular fringe order by a preselected phase,

three moiré image data of different colors shifted in phase are generated by a one-line or one-frame scanning time of said color sensor camera and an operation of said switching mechanism synchronous to each other, and

the three moiré image data of different colors are arithmetically processed for thereby tridimensionally measuring a surface configuration of a work.

42. The method as claimed in claim 41, wherein a range of the work to be tested by said testing optics is divided into a plurality of zones, and

a relative position between said testing optics and the work is sequentially varied in a direction perpendicular to a direction of division of said range and in said direction of division of said range, thereby measuring the surface configuration of the work zone by

zone.

43. The method as claimed in claim 42, wherein said light-sensitive device comprises a single or three or more line sensors.

44. The method as claimed in claim 42, wherein said light-sensitive device comprises an area sensor camera, and

an equation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera to thereby measure the surface configuration.

45. The method as claimed in claim 42, wherein said lattice pattern comprises a liquid crystal device.

46. The method as claimed in claim 41, wherein said light-sensitive device comprises a single or three or more line sensors.

47. The method as claimed in claim 41, wherein said light-sensitive device comprises an area sensor camera, and

an equation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera to thereby measure the surface configuration.

48. The method as claimed in claim 41, wherein said lattice pattern comprises a liquid crystal device.

49. In a surface configuration measuring method using, as testing optics, stereoscopic lattice type of moiré optics including a light source and a lattice pattern with a variable lattice pitch for producing moiré fringes, and a light-sensitive device including a lens and a pixel array for picking up said moiré fringes,

a lattice pitch of said lattice pattern is varied to thereby shift moiré fringes of a particular fringe order by a preselected phase,

at least three lines of moiré image data shifted in phase are generated by a one-line scanning time of said light-sensitive device and variation of the lattice pitch of said lattice pattern synchronous to each other, and

the at least three lines of moiré image data are arithmetically processed for thereby tridimensionally measuring a surface configuration of a work.

50. The method as claimed in claim 49, wherein a range of the work to be tested by said testing optics is divided into a plurality of zones, and

a relative position between said testing optics and the work is sequentially varied in a direction perpendicular to a direction of division of said range and in said direction of division of said range, thereby measuring the surface configuration of the work zone by zone.

51. The method as claimed in claim 50, wherein said light-sensitive device comprises a single or three or more line sensors.

52. The method as claimed in claim 50, wherein said light-sensitive device comprises an area sensor camera, and

an equation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera to thereby measure the surface configuration.

53. The method as claimed in claim 50, wherein said lattice pattern comprises a liquid crystal device.

54. The method as claimed in claim 49, wherein said light-sensitive device comprises a single or three or more line sensors.

55. The method as claimed in claim 49, wherein said light-sensitive device comprises an area sensor camera, and

an equation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera to thereby measure the surface configuration.

56. The method as claimed in claim 49, wherein said lattice pattern comprises a liquid crystal device.

57. In a surface configuration measuring method

using, as testing optics, stereoscopic lattice type of moiré optics including a light source and a stepped lattice pattern for producing moiré fringes, said stepped lattice pattern having at least three lattice surfaces different in height in a direction of an optical axis, and a light-sensitive device including a lens and pixels arranged at least in three lines for picking up said moiré fringes,

said pixels on each line pick up a moiré image via a particular one of said lattice surfaces for thereby shifting fringe patterns of a particular fringe order by a preselected phase,

at least three lines of moiré image data shifted in phase are generated by scanning times of said pixels on said lines synchronous to each other, and

the at least three lines of moiré image data are arithmetically processed for thereby tridimensionally measuring a surface configuration of a work.

58. The method as claimed in claim 57, wherein a range of the work to be tested by said testing optics is divided into a plurality of zones, and

a relative position between said testing optics and the work is sequentially varied in a direction perpendicular to a direction of division of said range and in said direction of division of said range, thereby

measuring the surface configuration of the work zone by zone.

59. The method as claimed in claim 58, wherein said light-sensitive device comprises a single or three or more line sensors.

60. The method as claimed in claim 58, wherein said light-sensitive device comprises an area sensor camera, and

an equation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera to thereby measure the surface configuration.

61. The method as claimed in claim 55, wherein said lattice pattern comprises a liquid crystal device.

62. The method as claimed in claim 57, wherein said light-sensitive device comprises a single or three or more line sensors.

63. The method as claimed in claim 57, wherein said light-sensitive device comprises an area sensor camera, and

an equation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera to thereby measure the surface configuration.

64. The method as claimed in claim 57, wherein said

lattice pattern comprises a liquid crystal device.

65. A surface configuration measuring apparatus using, as testing optics, stereoscopic lattice type of moiré optics including a light source and a lattice pattern for producing moiré fringes and a light-sensitive device including a lens and a camera for picking up said moiré fringes, said surface configuration measuring apparatus comprising:

a phase shifting mechanism for shifting moiré fringes of a particular fringe order by a preselected phase, said camera having a measurement range limited to a vicinity of said particular fringe order; and

data processing means for executing an arithmetic operation with at least three moiré image data shifted in phase by said phase shifting mechanism and output from said camera to thereby tridimensionally measure a surface configuration of a work.

66. The apparatus as claimed in claim 65, wherein a range of the work to be tested by said testing optics is divided into a plurality of zones, said apparatus further comprising a division-direction moving mechanism for sequentially moving a relative position between said testing optics and the work in a direction of division of said range.

67. The apparatus as claimed in claim 66, further

comprising a distance varying mechanism for varying a distance between said light source and said light-sensitive device.

68. The apparatus as claimed in claim 66, wherein said phase shifting mechanism varies a position of the work in a direction of an optical axis of said camera.

69. The apparatus as claimed in claim 66, wherein said phase shifting mechanism comprises a lattice pattern shifting mechanism for shifting a position of said lattice pattern on an optical axis of said camera.

70. The apparatus as claimed in claim 66, wherein the work is cylindrical

71. The apparatus as claimed in claim 66, wherein the work is flat.

72. The apparatus as claimed in claim 66, wherein said light-sensitive device comprises a single or three or more line sensors.

73. The apparatus as claimed in claim 66, wherein said camera comprises an area sensor camera, and

calculation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera for thereby measuring the surface configuration.

74. The apparatus as claimed in claim 66, wherein said lattice pattern comprises a liquid crystal device.

75. The apparatus as claimed in claim 65, further comprising a distance varying mechanism for varying a distance between said light source and said light-sensitive device.

76. The apparatus as claimed in claim 65, wherein said phase shifting mechanism varies a position of the work in a direction of an optical axis of said camera.

77. The apparatus as claimed in claim 65, wherein said phase shifting mechanism comprises a lattice pattern shifting mechanism for shifting a position of said lattice pattern on an optical axis of said camera.

78. The apparatus as claimed in claim 65, wherein the work is cylindrical

79. The apparatus as claimed in claim 65, wherein the work is flat.

80. The apparatus as claimed in claim 65, wherein said light-sensitive device comprises a single or three or more line sensors.

81. The apparatus as claimed in claim 65, wherein said camera comprises an area sensor camera, and

calculation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera for thereby measuring the surface configuration.

82. The apparatus as claimed in claim 65, wherein

said lattice pattern comprises a liquid crystal device.

83. A surface configuration measuring apparatus using, as testing optics, stereoscopic lattice type of moiré optics including a light source and a lattice pattern for producing moiré fringes and a light-sensitive device including a lens and a camera for picking up said moiré fringes, said camera comprising a pixel array, said surface configuration measuring apparatus comprising:

a moving mechanism for moving said lattice pattern back and forth in a direction of an optical axis of said light-sensitive device for thereby shifting moiré fringes of a particular order by a preselected phase;

synchronizing means for synchronizing a one-line scanning time of said light-sensitive device and a reciprocal movement of said lattice pattern; and

data processing means for executing an arithmetic operation with at least three lines of moiré image data shifted in phase, which are produced by the one-line scanning time of said light-sensitive device and a reciprocal movement of said lattice pattern synchronous to each other, for thereby tridimensionally measuring a surface configuration of a work.

84. The apparatus as claimed in claim 83, wherein a range of the work to be tested by said testing optics is divided into a plurality of zones, said apparatus

further comprising:

an in-zone moving mechanism for sequentially moving a relative position between said testing optics and the work in a direction perpendicular to a direction of division of said range; and

a division-direction moving mechanism for sequentially moving the relative position in the direction of division of said range.

85. The apparatus as claimed in claim 84, wherein the work is cylindrical

86. The apparatus as claimed in claim 84, wherein the work is flat.

87. The apparatus as claimed in claim 84, wherein said light-sensitive device comprises a single or three or more line sensors.

88. The apparatus as claimed in claim 84, wherein said camera comprises an area sensor camera, and

calculation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera for thereby measuring the surface configuration.

89. The apparatus as claimed in claim 84, wherein said lattice pattern comprises a liquid crystal device.

90. The apparatus as claimed in claim 83, wherein the work is cylindrical

91. The apparatus as claimed in claim 83, wherein the work is flat.

92. The apparatus as claimed in claim 83, wherein said light-sensitive device comprises a single or three or more line sensors.

93. The apparatus as claimed in claim 83, wherein said camera comprises an area sensor camera, and

calculation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera for thereby measuring the surface configuration.

94. The apparatus as claimed in claim 83, wherein said lattice pattern comprises a liquid crystal device.

95. A surface configuration measuring apparatus using, as testing optics, stereoscopic lattice type of moiré optics including a light source and a lattice pattern for producing moiré fringes and a light-sensitive device including a lens and a camera for picking up said moiré fringes, said camera comprising a pixel array, said lattice pattern comprising a stepped lattice pattern having at least three lattice surfaces, which are different in height in a direction of an optical axis, for shifting moiré fringes of a particular fringe order by a preselected phase, said surface configuration measuring apparatus comprising:

a moving mechanism for moving said stepped lattice pattern back and forth in a direction perpendicular to a direction of the optical axis of said light-sensitive device for thereby sequentially positioning said lattice surfaces on said optical axis;

synchronizing means for synchronizing a one-line scanning time of said light-sensitive device and a reciprocal movement of said stepped lattice pattern; and

data processing means for executing an arithmetic operation with at least three lines of moiré image data shifted in phase, which are produced by the one-line scanning time of said light-sensitive device and a reciprocal movement of said stepped lattice pattern synchronous to each other, for thereby tridimensionally measuring a surface configuration of a work.

96. The apparatus as claimed in claim 95, wherein a range of the work to be tested by said testing optics is divided into a plurality of zones, said apparatus further comprising:

an in-zone moving mechanism for sequentially moving a relative position between said testing optics and the work in a direction perpendicular to a direction of division of said range; and

a division-direction moving mechanism for sequentially moving the relative position in the direction

of division of said range.

97. The apparatus as claimed in claim 96, wherein the work is cylindrical

98. The apparatus as claimed in claim 96, wherein the work is flat.

99. The apparatus as claimed in claim 96, wherein said light-sensitive device comprises a single or three or more line sensors.

100. The apparatus as claimed in claim 96, wherein said camera comprises an area sensor camera, and

calculation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera for thereby measuring the surface configuration.

101. The apparatus as claimed in claim 96, wherein said lattice pattern comprises a liquid crystal device.

102. The apparatus as claimed in claim 95, wherein the work is cylindrical

103. The apparatus as claimed in claim 95, wherein the work is flat.

104. The apparatus as claimed in claim 95, wherein said light-sensitive device comprises a single or three or more line sensors.

105. The apparatus as claimed in claim 95, wherein said camera comprises an area sensor camera, and

calculation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera for thereby measuring the surface configuration.

106. The apparatus as claimed in claim 95, wherein said lattice pattern comprises a liquid crystal device.

107. A surface configuration measuring apparatus using, as testing optics, stereoscopic lattice type of moiré optics including a light source and a lattice pattern for producing moiré fringes and a light-sensitive device including a lens and a camera for picking up said moiré fringes, said camera comprising a color sensor camera, said surface configuration measuring apparatus comprising:

a moving mechanism for moving said lattice pattern back and forth in a direction of an optical axis of said color sensor camera for thereby shifting moiré fringes of a particular fringe order by a preselected phase;

filters of different colors positioned between a work and said color sensor camera;

a switching mechanism for selectively positioning said color filters on the optical axis of said color sensor camera;

synchronizing means for synchronizing a one-line or one-frame scanning time of said color sensor camera, a

reciprocal movement of said lattice pattern and an operation of said switching mechanism; and

data processing means for executing an arithmetic operation with at three colors of moiré image data shifted in phase, which are generated by the one-line or one-frame scanning time of said color sensor camera, the reciprocal movement of said lattice pattern and the operation of said switching mechanism, for thereby tridimensionally measuring a surface configuration of the work.

108. The apparatus as claimed in claim 107, wherein a range of the work to be tested by said testing optics is divided into a plurality of zones, said apparatus further comprising:

an in-zone moving mechanism for sequentially moving a relative position between said testing optics and the work in a direction perpendicular to a direction of division of said range; and

a division-direction moving mechanism for sequentially moving the relative position in the direction of division of said range.

109. The apparatus as claimed in claim 108, wherein the work is cylindrical

110. The apparatus as claimed in claim 108, wherein the work is flat.

111. The apparatus as claimed in claim 108, wherein

said light-sensitive device comprises a single or three or more line sensors.

112. The apparatus as claimed in claim 108, wherein said camera comprises an area sensor camera, and

calculation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera for thereby measuring the surface configuration.

113. The apparatus as claimed in claim 108, wherein said lattice pattern comprises a liquid crystal device.

114. The apparatus as claimed in claim 107, wherein the work is cylindrical

115. The apparatus as claimed in claim 107, wherein the work is flat.

116. The apparatus as claimed in claim 107, wherein said light-sensitive device comprises a single or three or more line sensors.

117. The apparatus as claimed in claim 107, wherein said camera comprises an area sensor camera, and

calculation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera for thereby measuring the surface configuration.

118. The apparatus as claimed in claim 107, wherein said lattice pattern comprises a liquid crystal device.

119. A surface configuration measuring apparatus using, as testing optics, stereoscopic lattice type of moiré optics including a light source and a lattice pattern for producing moiré fringes and a light-sensitive device including a lens and a camera for picking up said moiré fringes, said camera comprising a color sensor camera, said lattice pattern comprising a stepped lattice pattern having at least three lattice surfaces, which are different in height in a direction of an optical axis, for shifting moiré fringes of a particular fringe order by a preselected phase, said surface configuration measuring apparatus comprising:

a moving mechanism for moving said stepped lattice pattern back and forth in a direction of the optical axis of said color sensor camera for thereby sequentially positioning lattice patterns of said lattice surfaces on said optical axis;

color filters of different colors positioned between a work and said color sensor camera;

a switching mechanism for selectively positioning said color filters on the optical axis of said color sensor camera;

synchronizing means for synchronizing a one-line or one-frame scanning time of said color sensor camera, a reciprocal movement of said stepped lattice pattern and

an operation of said switching mechanism; and

data processing means for executing an arithmetic operation with three colors of moiré image data shifted in phase, which are produced by the one-line or one-frame scanning time of said color sensor camera, the reciprocal movement of said stepped pattern and the operation of said switching mechanism synchronous to each other, for thereby tridimensionally measuring a surface configuration of the work.

120. The apparatus as claimed in claim 119, wherein a range of the work to be tested by said testing optics is divided into a plurality of zones, said apparatus further comprising:

an in-zone moving mechanism for sequentially moving a relative position between said testing optics and the work in a direction perpendicular to a direction of division of said range; and

a division-direction moving mechanism for sequentially moving the relative position in the direction of division of said range.

121. The apparatus as claimed in claim 120, wherein the work is cylindrical

122. The apparatus as claimed in claim 120, wherein the work is flat.

123. The apparatus as claimed in claim 120, wherein

said light-sensitive device comprises a single or three or more line sensors.

124. The apparatus as claimed in claim 120, wherein said camera comprises an area sensor camera, and

calculation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera for thereby measuring the surface configuration.

125. The apparatus as claimed in claim 120, wherein said lattice pattern comprises a liquid crystal device.

126. The apparatus as claimed in claim 119, wherein the work is cylindrical

127. The apparatus as claimed in claim 119, wherein the work is flat.

128. The apparatus as claimed in claim 119, wherein said light-sensitive device comprises a single or three or more line sensors.

129. The apparatus as claimed in claim 119, wherein said camera comprises an area sensor camera, and

calculation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera for thereby measuring the surface configuration.

130. The apparatus as claimed in claim 119, wherein said lattice pattern comprises a liquid crystal device.

131. A surface configuration measuring apparatus using, as testing optics, stereoscopic lattice type of moiré optics including a light source and a lattice pattern with a variable lattice pitch for producing moiré fringes, and a light-sensitive device including a lens and a camera for picking up said moiré fringes, said camera comprising a pixel array, said surface configuration measuring apparatus comprising:

synchronizing means for synchronizing a one-line scanning time of said light-sensitive device and a lattice pitch varying operation of said lattice pattern; and

data processing means for executing an arithmetic operation with at least three lines of moiré image data shifted in phase, which are generated by the one-line scanning time of said light-sensitive device and the lattice pitch varying operation synchronous to each other, for thereby measuring a surface configuration of a work.

132. The apparatus as claimed in claim 131, wherein a range of the work to be tested by said testing optics is divided into a plurality of zones, said apparatus further comprising:

an in-zone moving mechanism for sequentially moving a relative position between said testing optics and the work in a direction perpendicular to a direction of division of said range; and

a division-direction moving mechanism for sequentially moving the relative position in the direction of division of said range.

133. The apparatus as claimed in claim 132, wherein the work is cylindrical

134. The apparatus as claimed in claim 132, wherein the work is flat.

135. The apparatus as claimed in claim 132, wherein said light-sensitive device comprises a single or three or more line sensors.

136. The apparatus as claimed in claim 132, wherein said camera comprises an area sensor camera, and

calculation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera for thereby measuring the surface configuration.

137. The apparatus as claimed in claim 132, wherein said lattice pattern comprises a liquid crystal device.

138. The apparatus as claimed in claim 131, wherein the work is cylindrical

139. The apparatus as claimed in claim 131, wherein the work is flat.

140. The apparatus as claimed in claim 131, wherein said light-sensitive device comprises a single or three or more line sensors.

141. The apparatus as claimed in claim 131, wherein said camera comprises an area sensor camera, and

calculation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera for thereby measuring the surface configuration.

142. The apparatus as claimed in claim 131, wherein said lattice pattern comprises a liquid crystal device.

143. A surface configuration measuring apparatus using, as testing optics, stereoscopic lattice type of moiré optics including a light source and a lattice pattern for producing moiré fringes, said stepped lattice pattern having at least three lattice surfaces different in height in a direction of an optical axis for shifting fringes of a particular fringe order by a preselected phase, and a light-sensitive device including a lens and a camera for picking up said moiré fringes, said camera comprising three or more parallel lines of pixels each for picking up a work via a particular one of said lattice surfaces to thereby output a moiré image shifted in phase from said fringes of said particular fringe order by said preselected phase, said surface configuration measuring apparatus comprising:

a mechanism for shifting a relative position between said moiré optics and a surface of the work;

synchronizing means for synchronizing scanning times of said three lines of pixels of said camera; and

data processing means for executing an arithmetic operation with at least three lines of moiré image data shifted in phase, which are generated by an operation of said mechanism and the scanning times of said three lines of pixels synchronous to each other, for thereby tridimensionally measure a configuration of the work.

144. The apparatus as claimed in claim 143, wherein a range of the work to be tested by said testing optics is divided into a plurality of zones, said apparatus further comprising:

an in-zone moving mechanism for sequentially moving a relative position between said testing optics and the work in a direction perpendicular to a direction of division of said range; and

a division-direction moving mechanism for sequentially moving the relative position in the direction of division of said range.

145. The apparatus as claimed in claim 144, wherein the work is cylindrical

146. The apparatus as claimed in claim 144, wherein the work is flat.

147. The apparatus as claimed in claim 144, wherein said light-sensitive device comprises a single or three

or more line sensors.

148. The apparatus as claimed in claim 144, wherein said camera comprises an area sensor camera, and

calculation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera for thereby measuring the surface configuration.

149. The apparatus as claimed in claim 144, wherein said lattice pattern comprises a liquid crystal device.

150. The apparatus as claimed in claim 143, wherein the work is cylindrical

151. The apparatus as claimed in claim 143, wherein the work is flat.

152. The apparatus as claimed in claim 143, wherein said light-sensitive device comprises a single or three or more line sensors.

153. The apparatus as claimed in claim 143, wherein said camera comprises an area sensor camera, and

calculation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera for thereby measuring the surface configuration.

154. The apparatus as claimed in claim 143, wherein said lattice pattern comprises a liquid crystal device.

155. A surface configuration measuring apparatus

using, as testing optics, stereoscopic lattice type of moiré optics including a light source and a lattice pattern for producing moiré fringes, and a light-sensitive device including a lens and a camera for picking up said moiré fringes, said camera comprising at least three parallel lines of pixels, a surface of a work being parallel to and spaced by a same distance from said at least three parallel lines of pixels at a side opposite to said camera, said lattice pattern being not inclined in a direction in which said pixels are arranged, but being inclined in a direction in which said lines are arranged, such that each line of pixels is spaced by a particular distance from said lattice pattern to thereby pick up said surface of said work in a form of a particular moiré image shifted by a preselected phase, said surface configuration measuring apparatus comprising:

a mechanism for moving a relative position between said moiré optics and the surface of the work in a direction in which said lattice pattern is inclined;

synchronizing means for synchronizing scanning times of said at least three lines of pixels; and

data processing means for executing an arithmetic operation with at least three lines of moiré image data shifted in phase, which are generated by an operation of said mechanism and the scanning times of said three lines

of pixels synchronous to each other, for thereby tridimensionally measure a configuration of the work.

156. The apparatus as claimed in claim 155, wherein a range of the work to be tested by said testing optics is divided into a plurality of zones, said apparatus further comprising:

an in-zone moving mechanism for sequentially moving a relative position between said testing optics and the work in a direction perpendicular to direction of division of said range; and

a division-direction moving mechanism for sequentially moving the relative position in the direction of division of said range.

157. The apparatus as claimed in claim 156, wherein the work is cylindrical

158. The apparatus as claimed in claim 156, wherein the work is flat.

159. The apparatus as claimed in claim 156, wherein said light-sensitive device comprises a single or three or more line sensors.

160. The apparatus as claimed in claim 156, wherein said camera comprises an area sensor camera, and

calculation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera for thereby measuring the

surface configuration.

161. The apparatus as claimed in claim 156, wherein said lattice pattern comprises a liquid crystal device.

162. The apparatus as claimed in claim 155, wherein the work is cylindrical

163. The apparatus as claimed in claim 155, wherein the work is flat.

164. The apparatus as claimed in claim 155, wherein said light-sensitive device comprises a single or three or more line sensors.

165. The apparatus as claimed in claim 155, wherein said camera comprises an area sensor camera, and

calculation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera for thereby measuring the surface configuration.

166. The apparatus as claimed in claim 155, wherein said lattice pattern comprises a liquid crystal device.

167. A surface configuration measuring apparatus using, as testing optics, stereoscopic lattice type of moiré optics including a light source and a lattice pattern for producing moiré fringes, and a light-sensitive device including a lens and a camera for picking up said moiré fringes, said camera comprising at least three parallel lines of pixels that are parallel to said lattice pattern,

a surface of a work, which faces said camera with the intermediary of said lattice pattern, being parallel to and spaced by a same distance from said lattice pattern, said at least three lines of pixels each picking up a particular portion of said surface of said work as a visual field, said lattice pattern having different pitches each being assigned to a particular visual field such that each line of pixels output a moiré image shifted by a preselected phase, said surface configuration measuring apparatus comprising:

a mechanism for moving a relative position between said moiré optics and the surface of the work in a direction in which said at least three lines of said camera are arranged;

synchronizing means for synchronizing scanning times of said at least three lines of pixels; and

data processing means for executing an arithmetic operation with at least three lines of moiré image data shifted in phase, which are generated by an operation of said mechanism and the scanning times of said three lines of pixels synchronous to each other, for thereby tridimensionally measure a configuration of the work.

168. The apparatus as claimed in claim 167, wherein a range of the work to be tested by said testing optics is divided into a plurality of zones, said apparatus

further comprising:

an in-zone moving mechanism for sequentially moving a relative position between said testing optics and the work in a direction perpendicular to a direction in a direction of division of said range; and

a division-direction moving mechanism for sequentially moving the relative position in the direction of division of said range.

169. The apparatus as claimed in claim 168, wherein the work is cylindrical

170. The apparatus as claimed in claim 168, wherein the work is flat.

171. The apparatus as claimed in claim 168, wherein said light-sensitive device comprises a single or three or more line sensors.

172. The apparatus as claimed in claim 168, wherein said camera comprises an area sensor camera, and

calculation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera for thereby measuring the surface configuration.

173. The apparatus as claimed in claim 168, wherein said lattice pattern comprises a liquid crystal device.

174. The apparatus as claimed in claim 167, wherein the work is cylindrical

175. The apparatus as claimed in claim 167, wherein the work is flat.

176. The apparatus as claimed in claim 167, wherein said light-sensitive device comprises a single or three or more line sensors.

177. The apparatus as claimed in claim 167, wherein said camera comprises an area sensor camera, and

calculation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera for thereby measuring the surface configuration.

178. The apparatus as claimed in claim 167, wherein said lattice pattern comprises a liquid crystal device.

179. A surface configuration measuring apparatus using, as testing optics, stereoscopic lattice type of moiré optics including a light source and a lattice pattern for producing moiré fringes, and a light-sensitive device including a lens and a camera for picking up said moiré fringes, said camera comprising at least three parallel lines of pixels that are parallel to said lattice pattern, a surface of a work being not inclined in a direction in which said pixels are arranged, but being inclined in a direction in which said lines are arranged, such that each line of pixels picks up a particular portion of said surface of said work spaced by a particular distance from said

lattice pattern as a visual field to thereby pick up said portion in a form of a particular moiré image shifted by a preselected phase, said surface configuration measuring apparatus comprising:

a mechanism for moving a relative position between said moiré optics and the surface of the work in a direction in which said surface is inclined;

synchronizing means for synchronizing scanning times of said at least three lines of pixels; and

data processing means for executing an arithmetic operation with at least three lines of moiré image data shifted in phase, which are generated by an operation of said mechanism and the scanning times of said three lines of pixels synchronous to each other, for thereby tridimensionally measure a configuration of the work.

180. The apparatus as claimed in claim 179, wherein a range of the work to be tested by said testing optics is divided into a plurality of zones, said apparatus further comprising:

an in-zone moving mechanism for sequentially moving a relative position between said testing optics and the work in a direction perpendicular to a direction of division of said range; and

a division-direction moving mechanism for sequentially moving the relative position in the direction

of division of said range.

181. The apparatus as claimed in claim 180, wherein the work is cylindrical

182. The apparatus as claimed in claim 180, wherein the work is flat.

183. The apparatus as claimed in claim 180, wherein said light-sensitive device comprises a single or three or more line sensors.

184. The apparatus as claimed in claim 180, wherein said camera comprises an area sensor camera, and

calculation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera for thereby measuring the surface configuration.

185. The apparatus as claimed in claim 180, wherein said lattice pattern comprises a liquid crystal device.

186. The apparatus as claimed in claim 179, wherein the work is cylindrical

187. The apparatus as claimed in claim 179, wherein the work is flat.

188. The apparatus as claimed in claim 179, wherein said light-sensitive device comprises a single or three or more line sensors.

189. The apparatus as claimed in claim 179, wherein said camera comprises an area sensor camera, and

calculation particular to a phase shifting method is applied to data output from a single or three or more rows of said area sensor camera for thereby measuring the surface configuration.

190. The apparatus as claimed in claim 179, wherein said lattice pattern comprises a liquid crystal device.